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Chemical & Engineering NEWS
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Pigment outlook darkens for 1980
A Key Chemicals Review Page 9

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Chemical Industry in China Page 21

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Cover: Bronze lion, symbol of Chinese emperors' might, guards a gate in Beijing (Peking) at Imperial Palace, once "Forbidden City," but now a public museum. Photo by C&EN's Richard J. Seltzer

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Business

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Special Report

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Pigments head for lackluster 1980

Carbon black and titanium dioxide had a good year or two in the late 1970's, but low capacity use and recession loom in 1980

As with most other groups of leading U.S. commercial chemicals, healthy business finally caught up with top pigments in the economic expansion from 1975 through 1979. After a shaky start in 1975 and 1976, pigments moved up to various peaks for particular products in 1978 and 1979. From here on, however, producers face declining profitability brought about by increased plant capacity on one hand and declining market growth on the other.

The two pigments detailed on the following pages in C&EN's Key Chemical series are carbon black and titanium dioxide, together worth $1.4 billion in 1979. Besides holding the unchallenged leads as the top black and the top white pigments, carbon black and titanium dioxide impart valuable additional properties to end products, notably strength by carbon black and resistance to surface oxidation by titanium dioxide. Among all commercial U.S. chemicals, carbon black was 32nd in production volume in 1978, and titanium dioxide 49th.

The two pigments have shown different cycles in their business during the 1970's but have shared a common problem—lack of good demand growth. Both were hit hard after a decade production peak in 1973 and 1974, and neither has since recovered this height. Even with rising prices, the two chemicals' dollar-value growth in the 1970's pales beside the value growth in other chemical categories, such as petrochemicals and plastics.

More than most chemicals, carbon black and titanium dioxide have had to contend with customer resistance of different sorts since the 1974–75 recession. Titanium dioxide, a relatively high-priced basic chemical, ran into a cost-cutting move by paint makers to lower its proportion in paint formulations. Although this trend now may be reversed because of a consumer backlash, it hurt titanium dioxide growth.

Carbon black, perhaps the best chemical proxy for the automobile industry, caught the full brunt of the energy cost pinch from late 1973 to the present. Americans have reacted to the soaring price of gasoline in several ways that reduce the demand for new tires, the main outlet for carbon black.

Struggling with these basic handicaps in demand growth, carbon black and titanium dioxide rose slowly into reasonably good business. Tied heavily to consumer durables, carbon black reached a healthier state first in 1977 and held it through 1978. But then, along with everything else connected with automobiles, carbon black's fortunes pitched sharply downward in 1979. As in 1974, autos felt the economic slowdown well before other industries and dragged carbon black down. No relief is in sight until possibly late in 1980.

Titanium dioxide's various problems delayed recovery after the 1974–75 recession until 1978 and 1979. A bulge in excess plant capacity was brought down by closings due to pollution problems. But demand growth still could not catch up, ironically, in part, because of positive improvement in product properties enabling savings by users.

The irony was compounded by the Federal Trade Commission, which sought to break up Du Pont's leading position in titanium dioxide essentially because the company developed better technology, the ilmenite chloride process, and refused to license it. The initial decision on the case by an FTC administrative law judge sharply repudiated the FTC case (C&EN, Sept. 24, page 6), which is now on appeal to the commission. Last week Du Pont dedicated a large new plant using the ilmenite chloride process at DeLisle, Miss.

Du Pont's new plant, for all its advantages, may dampen short-term prospects for titanium dioxide. The plant has come on stream at the beginning of a likely business slowdown when existing capacity was already adequate to fill demand.

Titanium dioxide producers once again may find growth years for their high-value, high-property, high-technology product. In the late 1970's, however, these characteristics seemed to curb as much as promote it.

Carbon black producers also have a superior product for its uses and, unlike titanium dioxide producers, are protected from challengers by a low price. But carbon black must wait out a basic efficiency drive in its main market, which will hold back greater volume in tires for some time.

Unfortunately for both products, the growth lag in view for their big uses cannot be compensated for by growth in newer uses. These markets, particularly plastic colorants, are still too small to affect the whole.

Bruce Greek, C&EN Houston; William Storck and William Fallwell, C&EN New York

After healthy pickup in late 1970's, leading pigments' capacity use is heading down

	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970
CARBON BLACK (billions of lb)											
Production	3.20	3.25	3.30	3.48	3.02	2.76	3.35	3.49	3.16	3.03	2.93
Capacity	4.28	4.01	3.85	4.10	4.07	4.25	4.22	4.17	3.98	3.75	3.66
Capacity use, %		75%	81%	86%	85%	74%	65%	79%	84%	80%	81%	80%
TITANIUM DIOXIDE (thousands of tons)											
Production	765	750	720	678	713	603	787	785	693	678	655
Capacity	1035	885	885	990	990	944	871	821	816	840	778
Capacity use, %		74%	85%	81%	68%	72%	64%	90%	96%	85%	81%	84%

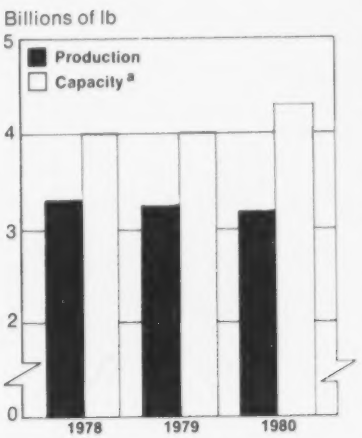
Note: Capacity is nameplate total as of first quarter each year. **Sources:** Department of Commerce, industry, C&EN estimates

C

Carbon black

- ***Demand dropping***
- ***Prices soft***
- ***Outlook poor***

PRODUCTION/CAPACITY



a As of first quarter

HOW MADE

Partial oxidation of residual hydrocarbons from oil refining and olefins production

MAJOR END USES

Tires 67%, other rubber products 25%, plastics, inks, paints, and other 8%

FOREIGN TRADE

1978 exports—116 million lb or 3.5% of production, 1978 imports—36 million lb or 1.1% of production

PRICES

Rubber grades 19.2 to 22.25 cents per lb in bulk lots, specialty pigment grades higher

COMMERCIAL VALUE

More than $600 million for total production, 1979

If black is considered figuratively as the color of gloom, carbon black is aptly named. U.S. producers of the pigment during the past year have been plagued by all sorts of trouble—increased costs, excess capacity, poor markets, soft prices, and high inventories, to name the most prominent.

Carbon black's 1979 problems actually began in the fourth quarter of 1978. It was then that tire companies, carbon black's biggest customers, began building inventories in anticipation of a strike. This buildup and the consequent sales bulge for carbon black continued into the first quarter. When the rubber workers' strike did not materialize, tire makers were left with huge inventories and little need for more carbon black when they cut their production.

The problem has been compounded further by the dramatic slowdown in new car sales. Thus, when car makers do not buy tires, tire makers cut down their purchases of carbon black.

Carbon black producers this year have found themselves in a classic cost-price squeeze, which is cutting profitability tremendously. Raw material costs for producers have jumped more than 60% since the start of 1979. At the same time, list prices of carbon black rose only 26 to 28%, and there has been discounting. Producers put through an increase in October, but at the same time had to increase the discounts to their customers. Producers will not say how large the discounts are, but they say that they are substantial.

Producers see no improvement in pricing in the near future. With massive inventories hanging over the market, producers are hard put to make any price increase stick. Thus pricing, at least through the first half of 1980 and possibly longer, is more than likely to be quite soft.

Adding to carbon black's problems is a lack of growth in its major markets, both in 1980 and probably longer. The tire market, which takes more than two thirds of carbon black production, has zero growth, according to carbon black producers. The depressed auto market is one reason. Another is that rubber companies are developing longer-lasting tires. Then there's the move to smaller cars and consequently smaller tires. Still another factor is the use of emergency, lightweight spare tires instead of regular tires as spares for weight savings in new cars.

Similarly, the market for carbon black in other rubber uses such as conveyor belts and industrial applications is growing very little—perhaps no more than 2% per year, and next year such growth probably will be flat.

The only market for carbon black that is growing is its use in plastics, both as a colorant and a strengthener. Producers say that this area will increase about 6% next year; however, as an end market, plastics take very little carbon black, probably no more than 2% of carbon black production.

Carbon black's remaining markets, which are small and mostly mature, are showing little if any growth. Its use in printing ink, the biggest end use after elastomers, takes only 2.5% of production and is growing at no more than 2% per year. As a colorant for paint, carbon black's growth is very slow, reflecting lack of growth in the paint industry. Paint takes about 0.5% of production.

Even the outlook for exports, which take about 3.5% of U.S. production, is bleak. More than one third of carbon black exports go to Taiwan, South Korea, and other Asian markets. However, within the next year or so, some of these countries will bring on stream carbon black plants of their own. For instance, Thai Carbon Black Co. is building a 35 million lb-per-year plant scheduled to come on stream soon. And Korea Steel Chemical Co. is building a 66 million lb-per-year plant slated to start up in late 1980.

Capacity in the U.S. is more than ample to handle any carbon black needs for the next few years. With the construction of additional plants this year, capacity has increased 7.5% from 1978 to about 4.3 billion lb. There is some talk among producers of closing older plants, but producers also say that any capacity that is shut down will be made up with expansions elsewhere. If this is true, capacity will remain stable and thus poorly used in the near future.

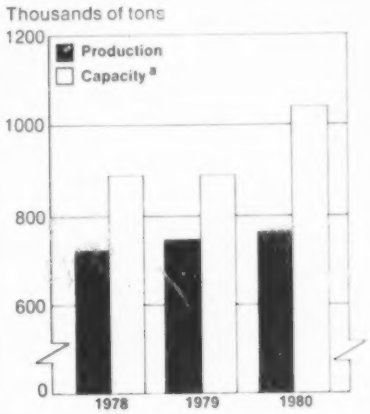
All in all, carbon black makers are so pessimistic that they are not even using the old rallying cry, "Wait until next year." They are more often saying, "Wait until 1981 or 1982."

TiO_2

Titanium dioxide

- ***Demand up modestly***
- ***Capacity jumping***
- ***Prices still up***

PRODUCTION/CAPACITY



[a] As of first quarter.

HOW MADE

Recovered from natural and synthetic ores, using chlorine or sulfuric acid

MAJOR END USES

Surface coatings 50%, paper coatings and fillers 25%, plastics and rubber fillers 15%, ceramics 5%

FOREIGN TRADE

Exports—less than 40,000 tons, imports—about 115,000 tons

PRICES

Rutile grades 59 cents per lb, bulk contract; anatase grades 53 cents per lb, bulk contract; no significant spot market

COMMERCIAL VALUE

$300 million for total production, 1979

Titanium dioxide producers in the U.S. are gearing for a so-so production year in 1980. Sales of the dominant white pigment in 1980 probably will about equal sales in 1979.

Production could be up a bit because of inventory building and a possible small drop in imports. However, the output gain probably will not be more than 3%, or about 25,000 tons. Total 1980 production more likely would be about 765,000 tons, following an output of 750,000 tons in 1979.

This outlook takes into account the effects of a U.S. recession on consumer products containing titanium dioxide. Much titanium dioxide goes into consumer nondurables such as paper and plastics, which ride up and down with the business cycle. The pigment also has large uses in autos and housing, durables which usually magnify swings in the business cycle.

Currently, inventories of titanium dioxide are at a low point in recent history. Low stocks could lead to some supply problems during the first quarter of 1980. However, any snag could be remedied quickly because U.S. plant capacity substantially exceeds even optimistic forecasts for immediate demand.

Estimates of domestic U.S. production of titanium dioxide in 1980 range from 760,000 to 775,000 tons. The high side is just 3% over the current estimate for 1979 production of about 750,000 tons. Production in 1979 is up modestly, about 4%, from 1978 production of 720,000 tons.

Producing enough titanium dioxide to meet demand in 1980 isn't likely to be a problem except in the fairly remote event that ore supplies get much tighter than they are now. U.S. titanium dioxide capacity as 1980 begins will exceed 1 million tons with the startup of Du Pont's new plant near DeLisle, Miss. This plant was dedicated last week after an extended history of planning and construction that included a considerable delay in the mid-1970's.

On paper, because of the industry-wide capacity increase of 150,000 tons from Du Pont's plant, overall capacity use in 1980 could sink below 75% of the nameplate total from 85% in 1979. But Du Pont's new plant isn't expected to run at capacity for some time.

In addition, other titanium dioxide plants have had a record of production difficulties, many of which became severe as companies struggled to meet environmental regulations. The result is little concern in the industry about what might seem to be large overcapacity.

Similarly, the capacity situation would seem to affect both foreign trade and pricing. Theoretically, excess capacity would drive down imports, increase exports, and put downward pressure on prices. However, none of these possible impacts likely would be large.

Imports, which are substantial, could actually decline slowly during 1980, as in 1979, for various economic reasons, among which is the lower value of the dollar. Exports might increase slightly but more under the influence of world demand than of U.S. capacity.

Prices could be under pressure in 1980, but they probably will still rise because of rising energy costs. Although this cost justification is viewed as strong, no price increase seems due Jan. 1, inasmuch as the customary advance notices apparently have not gone out to contract customers.

Price increases during 1980 likely will have a negligible effect on titanium dioxide use. In a consumer product, titanium dioxide's share of the total cost is tiny.

A pertinent example is paint, titanium dioxide's largest market. For some years, paint makers reduced the amount of titanium dioxide in their formulations as one way to hold down costs. For a while, paint performance held up because of counterbalancing improvements in titanium dioxide properties. More recently, however, paint performance has declined, and dissatisfied consumers have tried switching to substitutes such as siding. As a result, paint sales at best have held level.

Faced with this reaction, paint makers are turning to selling better-quality formulations at higher prices and better profits. The effect on titanium dioxide appears to be increased use. Use of titanium dioxide in paints may increase 1 to 2% during 1980, even though housing starts will be relatively low. This increase could offset decreases in titanium dioxide sales in other much smaller uses. And total sales may hold even for the year.

Bad image a problem for chemical industry

There is an intuitive feeling that the chemical industry is entering a new era. Technical competence is not in question nor is industrial productivity. Rather, in addition to the universal problem of energy, the chemical industry's problems in the new era are more in the nature of rebuilding public confidence and in reversing misperceptions of an industry that hasn't done much to defend its past good performance.

The most demanding issues in the near future are health, worker safety, and environmental protection. These were explored from several points of view during a workshop at the American Institute of Chemical Engineers' 72nd Annual Meeting, held in San Francisco.

The closest thing to a composite public view of the chemical industry was provided by James B. Lindheim, vice president of the firm of Yankelovich, Skelly & White. A decade of public opinion polls by Lindheim's firm indicates that much of the troubles of the chemical industry also are being experienced throughout society.

In the 1970's, Lindheim says, there was nothing less than a massive social transformation of American society. He believes that most important in that transformation was the diminution, and maybe even the elimination, of the Christian ethic as a basic motivation. It has been replaced, according to the polls, with a new ethic of "self."

An individual was formerly valued for what he contributed to society through good works, family cohesion, national service, and the like. Today, Lindheim says, it appears that service to self far overshadows everything else and the criterion for success is "finding one's self." The new ethic of self pervades all age groups and all parts of the country.

Another important social trend in the 1970's that contributed to a new era of challenge for the chemical industry is called by Lindheim the "philosophy of entitlement." The basic idea is that "I am entitled to something" from the national institutions, and this includes trouble-free products from the chemical industry.

At the same time, the polls suggest that there is no desire for a welfare state—a seeming contradiction. Lindheim explains that the philosophy of entitlement is concerned more with providing a safety net than with letting someone or something else run one's life. To Lindheim this suggests social parentalism rather than paternalism. In looking ahead to the 1980's, Lindheim sees an acceleration of these trends.

Fleming: public self-praise needed

In refining his viewpoint to the specific realm of the chemical industry, Lindheim notes that the chemical industry has experienced all the problems of other industries, with two exceptions. The decline in confidence that hit all industry in the seventies didn't hit the chemical industry until about 1976. The only other one that experienced this delayed effect was the insurance industry. Also, when it did appear, public concern with the chemical industry was sharply focused on health, environmental protection, and worker safety.

Beginning roughly in 1976, the polls showed a sharp rise in the number of people who believed, rightly or wrongly, that the chemical industry was not doing a very good job in these three areas. Today more than half the people polled consider the chemical industry the worst in matters of health and environmental damage. The chemical industry is tied with the mining industry as the least safe industry to work in.

According to Lindheim, the reasons for the public perceptions of the chemical industry also have appeared in the polls. In the case of health, there has been an elevation of health matters to a national social issue during the 1970's. Closely related is the rise of "chemophobia," which, in the public mind, connects chemicals with cancer.

Cancer definitely is perceived as the biggest health problem. Today, say the polls, 80% of the public believe smoking cigarettes causes cancer. In addition, 50% believe exposure in the workplace causes cancer and 50% believe food additives cause cancer. Furthermore, 44% believe insecticides, pesticides, and herbicides can cause cancer.

Another reason for heightened public concern, says Lindheim, is the "media circus." Contending with the media, Lindheim believes, has never been an industry strong suit, and he voices some doubt that corporate ads defending industry positions receive high regard.

Despite the negative public reaction to the chemical industry, there isn't a widespread distrust of chemicals per se. The polls indicate that the idea of zero-risk products isn't given much credence. There is a definite desire for informed risk in which the public is given enough information to be able to judge the risk and proceed accordingly.

Lindheim believes that the worst of the chemophobia may be over, but there is still a very high degree of distrust to be countered by industry. Eventually, Lindheim says, it all boils down to a matter of trust. There is a need, he says, to tell the truth, be accessible to the public whenever possible, begin an auditing system for waste disposal, and to get the good record of industry before the public.

In presenting the industry's viewpoint, Richard Fleming, executive vice president of Air Products & Chemicals, notes that there is nothing new about risks with products. Most of the recent concern, he suggests, reflects some new perceptions, most of them incorrect. One that is properly perceived is that which recognizes that long-term exposure at very low levels can be dangerous.

However, Fleming says, it is totally wrong to believe, as some claim, that there is any real one-molecule mechanism for cancer causation. The rapid expansion of analytical techniques to very low detection limits has been a blessing and a curse. It has helped promote the one-molecule theories, he says, and also has been extrapolated to regulatory decisions without reason. Fleming believes the industry has suffered from the adoption of the no-risk philosophy in government regulation.

Fleming is strongly in favor of truth in the public arena, but he suggests that the chemical industry, in general, has been truthful in the past. Its safety record is extremely good. Its health exposure record is equally impressive. By and large its waste disposal record is good, although there have been some exceptions. But despite all these, the industry has not engaged in much public self-praise and that seems to be necessary to counter the often malign publicity by anti-industry groups. □